

ABSTRACT OF THE DISCLOSURE

A novel practicable type of gaseous optical gain medium for efficiently generating
5 intense, highly monochromatic, continuous-wave (CW) or pulsed, coherent light beams is
disclosed. Gain results from nonlinear optical pumping of a gas of Λ -type “three-level”
atoms, coherently phased (“dressed”) via application to the medium of two
monochromatic laser beams tuned to the resonance frequencies ω_o and ω'_o . Nonlinear
optical pumping of the “dressed-atom” gas is accomplished through the combined action
10 of two separate physical processes: (1) A low pressure gaseous discharge, occurring
continuously within the vessel containing the gain medium, produces intense narrow-
band fluorescence at ω_o and ω'_o through the process of electron impact excitation (EIE).
(2) Via a specific form of the nonlinear photonic process of stimulated hyper-Raman
scattering (SHRS), photons comprised by the narrow-band fluorescence generated in (1)
15 are efficiently converted to photons comprised by the propagating coherent light beams at
 ω_o and ω'_o , thus effecting amplification of the latter.